



SOUTH EASTERN KENYA UNIVERSITY
UNIVERSITY EXAMINATIONS 2017/2018

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN
COMPUTER SCIENCE ,BACHELOR OF INFORMATION TECHNOLOGY & BACHELOR OF
PROCUREMENT AND SUPPLY CHAIN MANAGEMENT**

SCI104: DATABASE SYSTEMS

DATE: 11TH DECEMBER, 2017

TIME: 10.30 -12.30 PM

SECTION A (30 MARKS) – COMPULSORY

Question One

- a) Outline two benefits of a multi-dimensional Database. **(2 marks)**
- b) With the aid of an example, explain the following components as used in databases:
- (i) tuple;
 - (ii) attribute. **(4 marks)**
- c) Distinguish between Database Administrator and Data Administrator. **(2 marks)**
- d) A Database architecture is made up of two levels, explain the levels **(4 marks)**
- e) Explain three anomalies experienced in a database that is poorly designed. **(6 marks)**
- f) Explain two properties of a transaction that facilitate realization of a consistent state in a database even when concurrent accesses and failures occur. **(4 marks)**
- g) Consider two transactions A and B operating on bank account records; Transaction B is summing account balances. Transaction A is transferring an amount 30 from account 1 to account 3 Account 1 = 100; Account 2 = 50; Account 3 = 25

Time	Transaction A	Transaction B	Acc1	Acc2	Acc3
T1	Read Acc1	Read Acc1	100	50	25
T2	Acc1-30	Sum+ Acc1	100	50	25
T3	Write Acc1	Read Acc2	70	50	25
T4	Read Acc3	Sum+ Acc2	70	50	25
T5	Acc3+30		70	50	25
T6	Write Acc3		70	50	55
T7	Commit	Read Acc3	70	50	55
T8		Sum+ Acc3	70	50	55
T9		Commit	70	50	55

- i) Give the value of the sum arrived at by transaction B. **(2 marks)**
- ii) State the name of the problem experienced by Transaction B. **(1 mark)**
- iii) Explain how the problem can be avoided. **(3 marks)**
- iv) Give the sum arrived at by transaction B when the problem has been avoided. **(2 marks)**

SECTION B (40 Marks): Attempt any TWO questions from this section

Question Two

- a) Outline the first four steps applied when constructing an Entity Model. **(4 marks)**
- b) Distinguish between *Discretionary control* and *Mandatory control* as used in Database systems. **(2 marks)**
- c) Convert the following **Customer table** to the second normal form **(4 marks)**

Customer_ID	Customer_Name	Order_Id	OrderTitle	SaleDescription
302	John	425	Order1	Sale11
302	John	426	Order2	Sale12
303	Wayne	427	Order3	Sale13
304	Mary	428	Order4	Sale14

- d) Explain two types of data independence used in data Database systems. **(4 marks)**
- e) Database systems have become common in most organizations, explain three ways they can be beneficial to an organization. **(6 marks)**

Question Three

- a) Outline two rules applicable when converting a table from Second Normal form to Third Normal form. **(2 marks)**
- b) Distinguish between differential and referential backup. **(2 marks)**
- c) Draw an entity relational diagram for the tables shown below: **(4 marks)**

<u>SID</u>	Name	Major	GPA
1234	John	CS	2.8
5678	Mary	EE	3.6

<u>SSN</u>	Name	Dept
9999	Smith	Math
8888	Lee	CS

- d) SQL is a fourth generation tool used in the development of social networks. Explain three of its categories. **(6 marks)**
- e) Roles are used to ease the management task of assigning a multitude of privileges to users. Explain three default roles used in Database systems. **(6 marks)**

Question Four

- a) Distinguish between *wait/die* and *wound/wait* as used in concurrency control. **(4 marks)**
- b) With the aid of a diagram explain two cardinality relationships **(4 marks)**
- c) Examine the table named: *Patient* below and attempt the questions that follow

PatientId	firstName	Surname	DOB	Gender	Telephone
1001	Phillip	Amir	08/12/95	Male	091212876
1002	Christine	Kent	12/11/97	Female	091245239
1003	Cindy	Westwood	04/09/95	Female	092247256
1004	Suzzane	Sunderland	01/05/96	Female	094240283

- i) Write SQL statement that could be used to create the table. Set the PatientID as the primary key and use appropriate data type for each field. **(3 marks)**
- ii) Write SQL statement that could be used to display all patients details. **(3 marks)**
- iii) Write SQL statement that could be used to display PatientID, Names date of birth(DOB) for all female patients whose first name starts with letter 'C'. **(4 marks)**
- iv) Write an SQL statement that could be used to delete the above table (make any necessary assumptions). **(2 marks)**