KABARAK **UNIVERSITY**

UNIVERSITY EXAMINATIONS

SECOND SEMESTER, 2018/2019 ACADEMIC YEAR

EXAMINATION FOR THE DEGREE OF BSC. IN INFORMATION TECHNOLOGY/ BUSINESS MANAGEMENT AND INFORMATION TECHNOLOGY

COMP 324: DATABASE MANAGEMENT SYSTEM 2

STREAM: [Y3S2]   **TIME: 9.00-11.00 AM**

EXAMINATION SESSION: JAN-APRIL   **DATE: 4/04/2019**

INSTRUCTIONS

- **(i)**   **Question one is compulsory and any other two**
- **(ii)**   **Do not write on the question paper**
- **(iii)**   **Show your working clearly**

QUESTION ONE: (30 MARKS)
a) Describe the following concepts in file organization:
    - (i) Page   (**1 mark**)
    - (ii) File organization   (**2 marks**)
b) Why do most organizations store their databases on external media storage? Explain three reasons.   (**3 mark**s)
c) Using a relevant example, explain what is a transaction?   (**2 marks**)
d) SQL can be used in two different ways. Explain   (**2 marks**)
e) Mention two main types of PL/SQL Block, and explain two differences between them.
                                                                                                      (**4marks**)
f) During transaction processing in a multi-user system, the database should always be left in a consistent state. Mention and explain the properties of a transaction.   (**8 marks**)
g) Write a PL/SQL program to check whether a given number is an even number or odd number, and display meaningful messages depending on the output of the condition. (*include comments in your code*)   (**4 marks**)

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h) Write a PL/SQL program to check whether a given number is a positive number, negative number or the number 0, and display meaningful messages depending on the output of the condition. (*include comments in your code*) (**4 marks**)

QUESTION TWO: (20 MARKS)
a) Explain four functions of database applications. (**4 marks**)
b) Using a suitable diagram, show the three main categories of database storage media and give an example in each category. (**3 marks**)
c) Discuss the following with respect to the categories mentioned in Q2(a)above:
   (i) Speed (**2 marks**)
   (ii) Capacity (**2 marks**)
   (iii)Cost (**2 marks**)
d) Explain the two-phase locking mechanism of concurrency control. (**3 marks**)
e) Write a program to assign your age and name to variables. The program should check if your age is greater than 18 or not. If it is, it should print "You are an adult" along with your name else it should print "You are still a minor".(*include comments in your code*) (**4 marks**)

QUESTION THREE: (20 MARKS)
a) During concurrency control enforcement, a deadlock might occur. Explain, using a suitable example diagram, what a deadlock is? (**3 marks**)
b) Explain two differences between traditional databases and data warehouses. (**4 marks**)
c) Concurrency control aims for the objective of serialisability;
   (i) What is a schedule? (**1 mark**)
   (ii) Differentiate between a serial schedule and a non-serial schedule. (**2 marks**)
   (iii)Differentiate between read lock and write lock. (**2 marks**)
d) Write a PL/SQL program that will accept two numbers for the user, perform multiplication operation on the numbers, and check whether the results of the operation is greater than 500 or now. Then display a meaningful message depending on the output of the condition. (*include comments in your code*) (**4 marks**)
e) Write a PL/SQL block using a relevant control structure that will use the basic loop control structure to print no.s 1 – 10 in descending order.(*include comments in your code*) (**4 marks**)

QUESTION FOUR: (20 MARKS)
a) Describe briefly what is involved when ensuring security in a database system. (**3 marks**)
b) Explain time stamping mechanism of concurrency control. (**2 marks**)
c) If a DBMS already supports discretionary and mandatory access controls, is there a need for encryption? Why? (**3 marks**)
d) Using a suitable diagram, describe the data model of the data warehouse (**4 marks**)
e) Write a PL/SQL block that will print out the message "*Easter Holidays is around the corner!*" five times. (*include comments*) (**4 marks**)

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(1 Peter 3:15)
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f) Write a PL/SQL block to ask the user to enter the student's marks and determine the GRADE according to the following criteria. (*include comments in your code*)   (**4 marks**)

Marks > 90	A
Marks > 80 AND < 90	B
Marks > 70 AND < 80	C
Marks > 60 AND < 70	D
Marks < 60	F

QUESTION FIVE: (20 MARKS)

a) Using a suitable example diagram, explain the 3-tier architecture of the database application system.   (**3marks**)

b) What is a data warehouse? Describe two characteristics of a data warehouse.   (**3 marks**)

c) Examine the following relations' schema:

> **Regions** (Region_Id, Region_Name)
>
> **Countries** (Country_Id, Country_Name, Region_Id)

   (i) Write SQL statements used to create the above relations.   (**3 marks**)

   (ii) Write SQL statement used to show all the data in both tables.   (**1 mark**)

   (iii) Write SQL statement used to show all countries belonging to the region Europe.   (**2 marks**)

   (iv) Using substitution variables, write a PL/SQL block that will show the region name, of any region id keyed in by the user. (*Use anchored type of variables. include comments in your program*)   (**4 marks**)

d) Following the criteria below, write a PL/SQL program that will display the description for a given grade entered by the user. (*include comments in your code*)   (**4 marks**)

Grade	Description
A	Excellent
B	Very Good
C	Good
D	Fair
F	Poor