Course No: IGGC3208, ESGD5204 **Course Title: Advanced Database** **Date: 29 / 05 / 2013** **No. of Questions: 5 Questions** **Time: 2 hours** **Using Calculator (Yes)**	**University of Palestine** **Final Exam** **2nd semester 2012/2013** **Total Grade: 50**	**Instructor Name: Eng. Eman Alajrami** **Student No.: _____** **Student Name: _____** **Dep. / Specialist: _____** **Using Dictionary (No)**

First Question	**No. of Branches (1)**	**(15/50)**

Q1 B1

Essay Questions:

a) Is it possible in general to have two primary indices on the same relation for different search keys? Explain your answer.

.....
.....
.....
.....
.....
.....

b) During its execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

c) What is bucket overflow in a hash file organization? What can be done to reduce the occurrence of bucket overflows?

.....
.....
.....
.....
.....
.....

d) Explain the basic steps of Query Processing? You may justify your answer by drawing.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

e) List the ACID properties of transactions. Explain the usefulness of each.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Course No: IGGC3208, ESGD5204 **Course Title: Advanced Database** **Date: 29 / 05 / 2013** **No. of Questions: 5 Questions** **Time: 2 hours** **Using Calculator (Yes)**	**University of Palestine** **Final Exam** **2nd semester 2012/2013** **Total Grade: 50**	**Instructor Name: Eng. Eman Alajrami** **Student No.: _____** **Student Name: _____** **Dep. / Specialist: _____** **Using Dictionary (No)**

Second Question	**No. of Branches (2)**	**(10/50)**

Q2 B1) Construct a B^+-tree for the following set of key values:

(2, 3, 5, 7, 11, 17, 19, 23, 29, 31)

Assume that the tree is initially empty and values are added in ascending order. Construct B^+-trees for the case where the number of pointers that will fit in one node is 5. (n = 5)

Course No: IGGC3208, ESGD5204 **Course Title: Advanced Database** **Date: 29 / 05 / 2013** **No. of Questions: 5 Questions** **Time: 2 hours** **Using Calculator (Yes)**	**University of Palestine** **Final Exam** **2nd semester 2012/2013** **Total Grade: 50**	**Instructor Name: Eng. Eman Alajrami** **Student No.: _____** **Student Name: _____** **Dep. / Specialist: _____** **Using Dictionary (No)**

Q2 B2) For the resulted B^+-tree of the previous branch:
show the form of the tree after each of the following operations:

i. Insert 9.
ii. Delete 23.
iii. Delete 19.

Course No: IGGC3208, ESGD5204 **Course Title: Advanced Database** **Date: 29 / 05 / 2013** **No. of Questions: 5 Questions** **Time: 2 hours** **Using Calculator (Yes)**	**University of Palestine** **Final Exam** **2nd semester 2012/2013** **Total Grade: 50**	**Instructor Name: Eng. Eman Alajrami** **Student No.: _____** **Student Name: _____** **Dep. / Specialist: _____** **Using Dictionary (No)**

Third Question	**No. of Branches (2)**	**(10/50)**

Q3 B1) Consider the following SQL query for a bank database:

select *T.branch-name*
from *branch T, branch S*
where *T.assets* > *S.assets* **and** *S.branch-city* = "Brooklyn"

Write an efficient relational-algebra expression that is equivalent to this query. Justify your choice.

……
……
……
……
……
……

Q3 B2) Let relations $r_1(A,B,C)$ and $r_2(C,D,E)$ have the following properties: r_1 has 20,000 tuples, r_2 has 45,000 tuples, 25 tuples of r_1 fit on one block, and 30 tuples of r_2 fit on one block. And Let the Memory size in Blocks be 2000 Blocks.

Estimate the number of block accesses required, using each of the following join strategies for $r1 \bowtie r2$:

a. Nested-loop join
b. Block nested-loop join

Hint: Use the following formulas as appropriate for each of the above strategies:

$n_r * b_s + b_r$ and $\lceil b_r / (M-2) \rceil * b_s + b_r$

……
……
……
……
……
……
……
……
……
……
……
……
……
……
……
……

Course No: IGGC3208, ESGD5204 **Course Title: Advanced Database** **Date: 29 / 05 / 2013** **No. of Questions: 5 Questions** **Time: 2 hours** **Using Calculator (Yes)**	**University of Palestine** **Final Exam** **2nd semester 2012/2013** **Total Grade: 50**	**Instructor Name: Eng. Eman Alajrami** **Student No.: _____** **Student Name: _____** **Dep. / Specialist: _____** **Using Dictionary (No)**

Fourth Question **No. of Branches (2)** **(7/50)**

Q4 B1) Suppose that we are using hashing on a file that contains records with the following search-key values:

2, 3, 5, 7, 11, 17, 19, 23, 29, 31

Show the hash structure for this file if the hash function is

h(x) = x mod 8 and buckets can hold three records.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Q4 B2) Show how the hash structure resulted from the previous question changes as the result of each of the following steps:

a. Delete 11. b. Delete 31. c. Insert 1. d. Insert 15.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

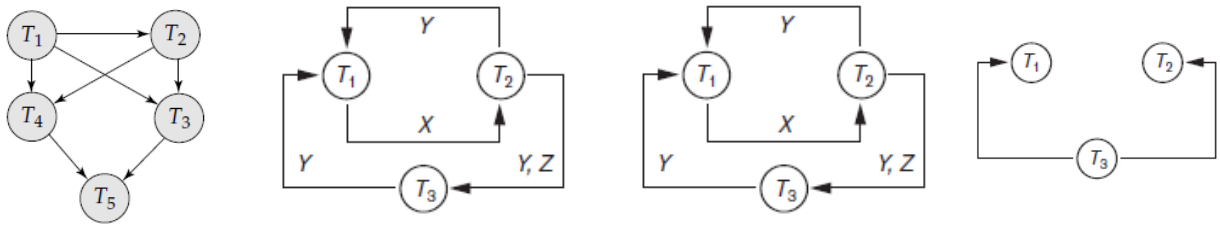
.....

.....

Course No: IGGC3208, ESGD5204 **Course Title: Advanced Database** **Date: 29 / 05 / 2013** **No. of Questions: 5 Questions** **Time: 2 hours** **Using Calculator (Yes)**	**University of Palestine** **Final Exam** **2nd semester 2012/2013** **Total Grade: 50**	**Instructor Name: Eng. Eman Alajrami** **Student No.: _____** **Student Name: _____** **Dep. / Specialist: _____** **Using Dictionary (No)**

Fifth Question — No. of Branches (2) — (8/50)

Consider the follwing precedence graph. Which of them is **conflict serializable**? If yes give an *equivalent serial schedule*. If no explain why?



(a) **(b)** **(c)** **(d)**

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

End of Questions
Good Luck