

# NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

## FACULTY OF INDUSTRIAL TECHNOLOGY

### DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING

Bachelor of Engineering (Honours) Degree in Industrial and Manufacturing Engineering

#### Computer Applications – TIE 2109

SUPPLEMENTARY EXAMINATIONS JUNE 2013

Time allowed: 3 hours

Instructions: Answer FIVE (5) questions.

#### Question 1

- Identify three types of database models and briefly explain each type. [9]
- Define each of the following relationships with the aid of well labeled diagrams. [6]
  - Ternary
  - Recursive
- What does the acronym SQL stand for? [1]
- Write syntax to illustrate how each of the following Data Manipulation Language (DML) statements are used: [9]
  - SELECT
  - INSERT
  - UPDATE

#### Question 2

- Figure Q2 below shows how the CAD/CAM and CAE activities are integrated through the database which is the objective of computer integrated manufacturing (CIM).

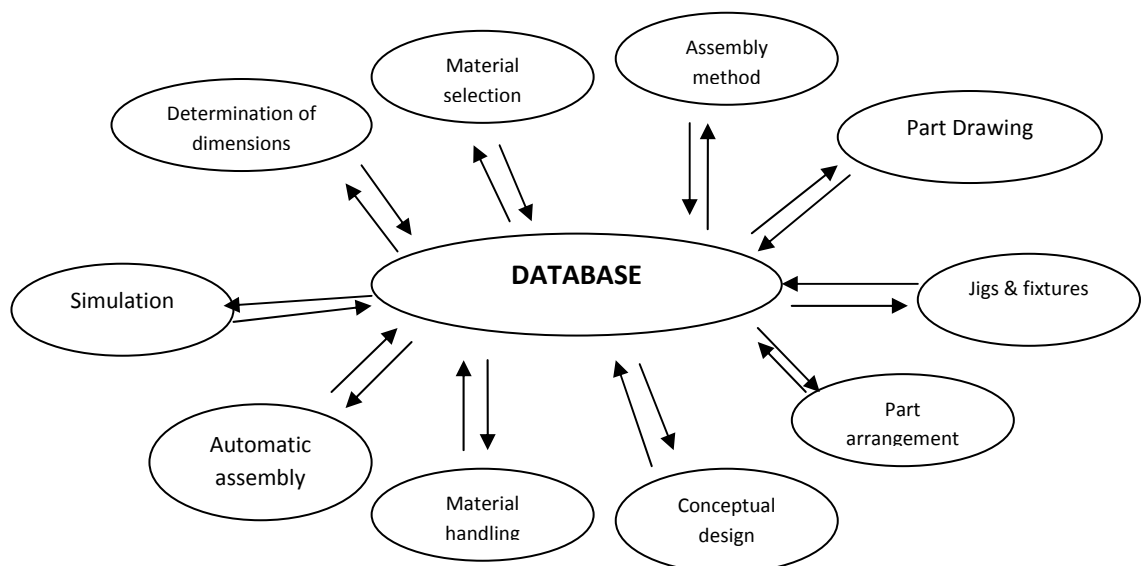


Figure Q1: Integration of CAD/CAM and CAE activities through a database

Use the information flow shown by the above figure to explain the role of engineering information modelling. Use the appropriate modelling platforms which enable the successful realization of such kind of computer integration. [10]

- b) Use the Unified Modelling Language (UML) concept to illustrate the following types of aggregation based on product structures of your own choice.
- Aggregation  
[3]
  - Composition  
[3]
  - Recursive Aggregation  
[4]

### Question 3

- a) Explain the applications of Real Time Databases in the following systems;
- Telecommunication systems  
[4]
  - Control systems  
[4]
  - e-Commerce and e-business  
[4]
- b) Figure Q3 below shows the design and conversion relationships among conceptual data models used in engineering information modelling. Explain the applications of the language schemas shown in the figure.  
[8]

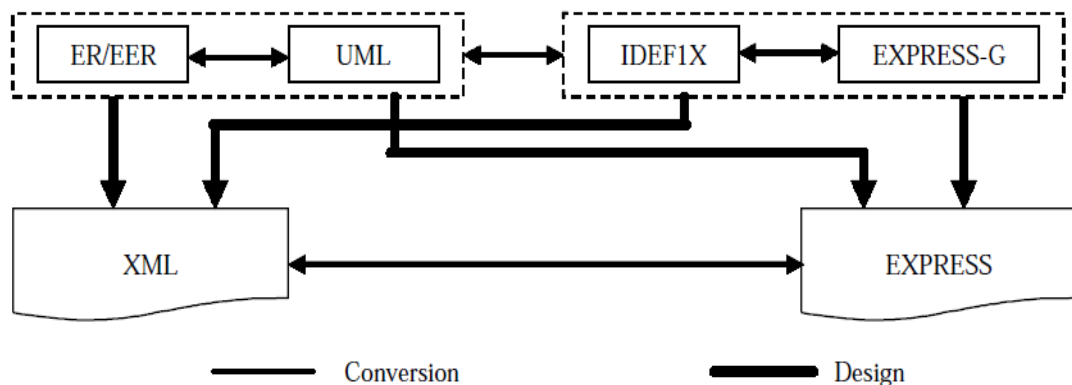


Figure Q3

### Question 4

- a) The “TIME” command is a very useful feature in AutoCAD. It allows you to track the time you spend working on a drawing.
- State one practical application of the “TIME” feature in relation to your external clients.  
[2]
  - Outline the steps that one must follow to execute the “TIME” command from the main menu.  
[2]
- b) “DIVIDE” and “MEASURE” are classified as measurement commands. Explain, with examples, what each of the two commands can do, stating how the two commands differ. [8]
- c) The DTEXT command does not offer the same type of formatting options available for paragraph text. Therefore you have to use special codes to create special characters and formats. Complete the table below by filling in the results obtained from each of the special codes. [8]

Code	Result
%%O	

%%U	
%%d	
%%C	

### Question 5

- What are the advantages of extracting block and attribute information from AutoCAD drawings. [6]
- Externally referencing a drawing is a powerful alternative to inserting it as a block. Explain the major advantages of using external references. [6]
- Explain the usage of the following block manipulation commands. [8]

Command	Usage
DBLIST	
EXPLODE	
MINSERT	
WBLOCK	

### Question 6

- Write a program in C++ to declare an array called distance of data type “double” to store five distance entries. The program should prompt the user by means of a screen print requesting for the distance entry, starting with “Distance 1:” up to the fifth distance. When all the entries are done, the program should display the five distance entries on the screen as shown below; [10]

```
Distance 1: 44.14
Distance 2: 720.52
Distance 3: 96.08
Distance 4: 468.78
Distance 5: 6.28
```

- One of the regular operations performed on an array consists of adding the values of the members to produce a sum. An illustration of the code to perform the operation is shown below;

```
#include <iostream>
using namespace std;

int main()
{
    // We know that we need a constant number of elements
    const int max = 10;
    int number[max];

    // We will calculate their sum
    int sum = 0;

    cout << "Please type 10 integers.\n";

    for( int i = 0; i < max; i++ )
    {
        cout << "Number " << i + 1 << ": ";
```

```
        cin >> number[i];
        sum += number[i];
    }

    cout << "\n\nThe sum of these numbers is " << Sum << "\n\n";
    return 0;
}
```

Interpret the code and write the results produced by the program.

[10]

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**END OF EXAM**