UGANDA MARTYRS UNIVERSITY

NKOZI

UNIVERSITY EXAMINATIONS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION SYSTEMS

END OF SEMESTER ASSESSMENT

BSC. IT & GEN III

SEM 1, YEAR 2019/20

DATA WAREHOUSING & BUSINESS INTELLIGENCE
CSC 3101

LUBAGA & NKOZI

DATE: 20TH DEC, 2019

TIME: 9: 30 – 12: 30 PM

VENUE: NKOZI, RUBAGA

DURATION: THREE HOURS

INSTRUCTIONS:

1. **ATTEMPT ALL QUESTIONS IN SECTION A (40 MARKS)**
2. **ATTEMPT THREE (03) QUESTIONS IN SECTION B (60 MARKS)**
3. **DO NOT OPEN THIS EXAM UNTIL YOU ARE TOLD TO DO SO**
4. **ALL ROUGH WORK SHOULD BE IN YOUR ANSWER BOOKLET**

SECTION A [40 MARKS]

Consider a business case of Air-Uganda Aviation company (AUAC). AUAC provides passenger and cargo services to East Africa countries, namely, Uganda, Ethiopian, Tanzania, Kenya, Rwanda, among other countries on differing blocks. The goal of this case is to analyze sales of the aviation company. Sales analysis must be presented based on products breaking down the sales by company and individual dealers and destinations. The aviation company would like to know who is buying the aviation services and in what quantities? How do the customers pay for the services? What effect does financing for the purchases have on the sales (method of payment)? How based can staff performance be analyzed? As an expert in data warehousing and business intelligence and AUAC provide solutions to the following queries.

QUESTION ONE

a) Design an information package to represent the above business case. Your information package must clearly show the dimensions, attributes, hierarchies and measured facts [5 Mks]

b) Using an illustration develop a snow flake schema [5 Mks]

c) Identify the three main approaches that could be used in integrating predictive insight into a Business Intelligence application [3 Mks]

d) Explain any two examples showing Applications of Data Mining Integrated with Business Intelligence [2 Mks]

e) Identify any three data mining software tools [3 Mks]

f) Using an example explain the difference between business intelligence (BI) and artificial intelligence [2 Mks]

g) With an example explain the concept of data mining (DM) as used in business intelligence [3 Mks]

h) Explain how the company could use market basket analysis to improve its business profits [2 Mks]

i) Identify any two problems that could be faced in the business case above of automobile manufacturer in data integration and consolidation [2 Mks]

j) Identify any four modes of applying data to a dimension table [2 Mks]

k) Identify the three broad functional categories of ETL tools [3 Mks]

l) State the two categories of data found in operational business systems [2 Mks]

m) Discuss the concept of Clean as you go Method in large data management [2 Mks]

n) Explain the four types of users of a warehouse in business intelligence [4 Mks]

SECTION B [60 Marks]

Considering the case study discussed in section A above, provide solutions to the following questions in section B.

QUESTION ONE

a) With the use of a well labeled illustration, discuss the steps in sequence that should be followed during the KDD process in the business case of AUAC [7 Mks]

b) Using examples discuss any five data mining models that could be used in the process of pattern discovery in AUAC [10 Mks]

c) With an example discuss the concept of overfitting as could be used in AUAC data mining [3 Mks]

QUESTION TWO

a) As the lead consultant AUAC, advise the data mining team on any five common classes of data mining tasks that could be employed. Use relevant examples for each task [5 Mks]

b) Explain any five (5) data pilot projects which could be used in the data mart pilot project for AUAC [5 Mks]

c) Describe any four data extraction techniques that could be used by AUAC in the extraction phase of ETL [4 Mks]

d) Differentiate between a foreign key and a surrogate key as could be used in the AUAC data warehousing [2 Mk]

e) Given that table staff in AUAC data warehouse has *sid* as a primary key and table department has *did* as a primary key. Write an SQL statement that would add a foreign key constraint of did in the students table [4 Mks]

QUESTION THREE

a) Using illustrations discuss the two basic types of data marts that could be adopted by AUAC [6 Mks]

b) Describe any four (4) Methods of information delivery from a business intelligence tool that could be adopted by AUAC [4 Mks]

c) With explanations, advise AUAC on any two reasons for not feeding data directly from source operation systems into an OLAP system [4 Mks]

d) Based on literature from data warehouse foundational authors (Inmon, Ponniah & Raj), with explanations advise AUAC on any six techniques that could be used in mining of information [6 Mks]

QUESTION FOUR

a) Based on your OLAP and data mining knowledge, advise AUAC on any five (5) differences between OLAP and Data mining techniques [5 Mks]

b) With use of a well-labeled diagram illustrate to the AUAC data warehouse team the Architecture of MOLAP Model [5 Mks]

c) With examples explain to AUAC the differences between MOLAP and ROLAP [6 Mks]

d) Differentiate between the following concepts as could be used by the AUAC analysis team [4 Mks]

(i) Drill down and roll up.

(ii) Slice and dice.

QUESTION FIVE

a) With examples, briefly explain the three types of complexities (errors) that could be encountered during the developing a data warehouse for AUAC [3 Mks]

b) With examples discuss any two types of metadata that could be used in meta data analysis for AUAC data warehouse [4 Mks]

c) Using a simple well labeled diagram illustrate the basic elements of a data warehouse environment that should be considered for the AUAC data warehouse [4 Mks]

d) With examples explain two categories of data used in the AUAC operational systems [4 Mks]

e) (i) With explanations advise AUAC on any three cloud computing types that could be adopted for their decision support database [3 Mks]

(ii) With explanations discuss any two backup types that could be adopted for the decision support data warehouse for AUAC [2 Mks]

END

MERRY XMAS AND HAPPY NEW YEAR