(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE COMPUTER SCIENCE

COURSE CODE : CSC 460 E

COURSE TITLE : EXPERT SYSTEMS

DATE: 18/12/2017 TIME: 08.00 A.M – 10.00A.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE [COMPULSORY] **[30 MARKS]**

a) What is an Expert System? State at least three characteristics that make Expert Systems differ from conventional systems [4 marks]

b) Give at least four typical examples of problems of which Expert Systems can be applied [4 marks]

c) Differentiate between
   i. Knowledge representation systems and Machine learning systems [4 marks]
   ii. Rule based systems and Non-production Systems [4 marks]
   iii. Factual Knowledge and Heuristic Knowledge [4 marks]
   iv. Mundane Task and Expert Task [4 marks]

d) What is meant by a variable in relation to jess? [2 mark]

e) Give a signature of declaring the following in JESS. [4 marks]
   i. Global Variable
   ii. Dotted Variable

SECTION B

QUESTION TWO: **[20 MARKS]**

a) With the help of a diagram, describe in details the global Expert System architecture [8 marks]

b) Discuss in details the process involved in the development of an Expert Systems [12 marks]

QUESTION THREE: **[20 MARKS]**

a) Real world Intelligent beings are continuously required to make decisions under a veil of uncertainty

   i. What are some of the source Uncertainty can arise from? [3 marks]
   ii. Give at least four approaches of dealing with the problem of uncertainty in knowledge-based systems and explain any two of the approach. [10 marks]

b) Explain the main advantages in keeping the knowledge base separate from the control module in knowledge-based systems [3 marks]

c) Differentiate between Domain knowledge and Case knowledge [4 marks]

QUESTION FOUR **[20 MARKS]**

a) With the help of diagrams, explain the difference between forward chaining and backward chaining and under what conditions each would be best to use for a given set of problems. [7 marks]

b) Explain at least four features and capabilities to consider when evaluating building tools for Expert System development. [4 marks]

d) Explain three areas in Kibabii University where an Expert System can be applied [9 marks]

QUESTION FIVE **[20 MARKS]**

a) State the criteria for an allowable symbol Jess language. [2 marks]

b) Using relevant signatures, give the syntax of list in Jess. [2 marks]

c) What will the following functions evaluate to: [3 marks]

i. Jess> (+ (+ 2 3) (* 3 3))

ii. Jess> (defglobal ?*x* = 3)

d) What are Jess Rules? Give the rule signature. [3 marks]

e) State the meaning of the following Jess.value class. [6 marks]

final public static int NONE = 0; ; *an empty value (not NIL)*
final public static int ATOM = 1; ; *a symbol*
final public static int STRING = 2; ; *a string*
final public static int INTEGER = 4; ; *an integer*
final public static int VARIABLE = 8; ; *a variable*
final public static int FACT = 16; ; *a jess.Fact object*

f) Give a detailed description of jess.Funcall. [4 marks]