



(Knowledge for Development)

KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS
YEAR THREE SEMESTER ONE EXAMINATIONS
FOR THE DEGREE OF BACHELOR OF SCIENCE
(COMPUTER SCIENCE)**

**COURSE CODE : CSC 361 E
COURSE TITLE : INTELLIGENCE AGENTS**

DATE: 18/01/2018 TIME: 2:00 P.M – 4:00 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

- a) Explain the following terminologies. [10 marks]
- i. Intelligent Agent
 - ii. Agent function
 - iii. Multi-agent system
 - iv. Learning agent
 - v. Percept Sequence
- b) Explain at least four capabilities of an Agent [6 marks]
- c) What is an ideal rational Agent and what does the rationality of an agent depend on? [6 marks]
- d) Differentiate between:
- i. A robotic agent and a software agent [4 marks]
 - ii. Inductive reasoning and deductive reasoning [4 marks]

QUESTION TWO [20 MARKS]

- a) Describe the structure of Intelligent Agents [6 marks]
- b) Distinguish between the following environment properties of intelligent agents [6 marks]
- i. Discrete and Continuous
 - ii. Static and Dynamic
- c) Intelligence requires knowledge. In the real world, the knowledge has some unwelcomed properties. State at least three of these properties and state the manner in which knowledge can be organized and used efficiently when using artificial intelligence technique. [8 marks]

QUESTION THREE [20 MARKS]

- a) With the help of diagrams, explain the following classes of intelligent agents [20 marks]
- i. simple reflex agents
 - ii. model-based reflex agents
 - iii. goal-based agents
 - iv. utility-based agents

QUESTION FOUR [20 MARKS]

- a) State at least four application areas of Intelligent agents [4 marks]
- b) Problem-solving is fundamental to many Artificial Intelligence based applications. Identify the features of problem-solving systems. [6 marks]
- c) Outline factors that need to be considered before learning can take place in the context of intelligent agents. [4 marks]
- d) Intelligent beings are continuously required to make decisions under a veil of uncertainty. State at least three sources of uncertainty that agents have to work with in reasoning and give at least three of approaches of dealing with the problem of uncertainty in knowledge-based systems and briefly explain any one of the approach. [6 marks]

QUESTION FIVE [20 MARKS]

a) Developers do not have to know how the JADE runtime environment works. They just need to start it before executing their agents. Starting JADE as a main or normal container and executing agents on it. Using a suitable java runtime environment, explain briefly how a new learner will configure and run agents. [5 marks]

b) The following program segment was written and built by a student in the JADE.

```
import jade.core.Agent;

public class BookBuyerAgent extends Agent {

    protected void setup() { // Printout a welcome message

        System.out.println("Hello! Buyer-agent "+getAID().getName()+" is ready.");

    }
}
```

Explain the need of: **import jade.core.Agent;** **extends Agent** and **void setup()**. [3 marks]

c) An agent can execute several behaviour concurrently. However it is important to notice that scheduling of behaviour in an agent is not pre-emptive (as for Java threads) but cooperative. Therefore it is the programmer who defines when an agent switches from the execution of a behaviour to the execution of the next one. Write an agent program that will enable agents to switch between behaviors. [4 marks]

d) i. Define the term ontology as used in agent development. [2 mark]

ii. Give the ontology representing the selected parameters relating to the 'Programming Multi Agent Systems with JADE' book as an instance (a Java object) of an application-specific class. [6 marks]