INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Academic term	2014-15
Year of study	Year 4
Semester	SEMESTER ONE
Date of examination	Thurs 8th Jan 2015
Time of examination	9.30am – 11.30am

Programme code	Programme title	Module code
BN402	Bachelor of Science (Honours) in Computing	COMP H4023
BN104	Bachelor of Science (Honours) in Computing	COMP H4023

Module title	Enterprise and Cloud Computing

Internal Examiner(s)	**Geraldine Gray**
External Examiner(s)	**Mr. Michael Barrett** **Dr. Tom Lunney**

Instructions to candidates:

1.	**To ensure that you take the correct examination, please check that the module and programme which you are following is listed in the table above.**
2.	**The paper consists of five questions. Candidates should complete ANY FOUR of the five questions**
3.	**The paper is worth 100 marks. Each question is worth 25 marks.**

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO

Question 1:

a) Report on the benefits to a company of hosting IT services on the cloud. In your report make reference to at least four of the seven elements typical of a cloud computing offering.

(15 marks)

b) Advise on any three areas of a Service Level Agreement (SLA) that a company should be aware of before availing of cloud services.

(10 marks)

Total: 25 marks

Question 2:

a) Discuss SQL injection attacks and the resulting threat to an application's data. Your answer should explain the threat itself, resulting dangers to data integrity, and how to prevent SQL injection attacks when developing an application.

(10 marks)

b) Explain the difference between declaritive and programmatic security when implementing session beans running in a Java Enterprise Edition (JEE) container. Your answer should include examples of each, and discuss the support for access control provided by a JEE container such as Glassfish.

(8 marks)

c) Explain how atomicity is guaranteed when a transaction updates data that is distributed across multiple nodes on a network. Assume data is stored in a relational database.

(7 marks)

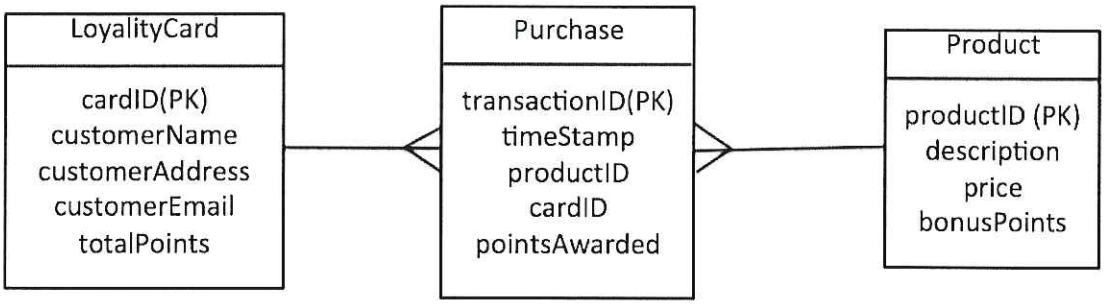
Total: 25 marks

Question 3:

a) Discuss the benefits of using entity classes and a presitent framework such as Java Persistence API (JPA) rather than coding calls to the database directly.

(5 marks)

b) Define entity classes to cater for the data requirements given in the Entity Replationship Diagram (ERD) below. You do not need to include set and get methods, or static queries in your answer. All relationships are bidirectional.



(16 marks)

c) Write JPQL queries for each of the following. Base your answers on the ERD from part b) above:

i) A list of customers living in Dublin. **(1 mark)**

ii) A list of customers who purchased products over €20.00

(3 marks)

Total: 25 marks

Question 4:

a) A Java Enterprise Edition (JEE) application typically includes three types of Entity Java Beans (EJBs), namely stateful session beans, stateless session beans and message beans. Explain each type of bean, and the role of each in a JEE application.

(10 marks)

b) You have been asked to implement the following application using JEE. Identify the entity classes, session beans and message beans needed to implement the functionality described below. Illustrate, with the aid of a diagram, the interactions between application components.

Christmas Tree ordering
Develop an application for wholesale Christmas tree ordering. A customer can place a request for Christmas trees in batches of 100. Suppliers can bid to meet the order, specifying price and delivery time. The customer can then accept a bid, and so select the supplier they wish to order from. Suppliers are notified by email when a bid is accepted.

(15 marks)

Total: 25 marks

Question 5:

a) Explain the six stages of a JSF page life cycle and how the life cycle implements the model–view–controller architectural pattern for user interfaces.

(15 marks)

b) Discuss how user input can be validated in JSF. Your answer should include both built-in and custom validation components, and make reference to the code extract below.

```
public void validate(FacesContext facesContext, UIComponent
    uIComponent, Object value) throws ValidatorException {
        Pattern pattern = Pattern.compile("\d{2,3}\w{1,2}\d{1,5}");
        Matcher matcher = pattern.matcher(
        (CharSequence) value);
        if (!matcher.matches()) {
            FacesMessage facesMessage =
            new FacesMessage(label
            + ": not a valid email address");
            throw new ValidatorException(facesMessage);
            }
        . . .
        }
```

(10 marks)

Total: 25 marks