INSTITUTE OF TECHNOLOGY
BLANCHARDSTOWN

Year	Year 4
Semester	Semester 1
Date of Examination	Wednesday 18 January 2012
Time of Examination	12.30pm – 2.30pm

Prog Code	**BN402**	**Prog Title**	Bachelor of Science (Honours) in Computing	**Module Code**	COMP H4023
Prog Code	**BN104**	**Prog Title**	Bachelor of Science (Honours) in Computing	**Module Code**	COMP H4023

Module Title	Enterprise and Cloud Computing

Internal Examiner(s): **Geraldine Gray**
External Examiner(s): **Dr. Richard Studdert**

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 tables 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) With reference to at least one case study you are familiar with, give examples of the types of development challenges that JEE is designed to solve.

15 marks

b) Discuss the range of services available to an Enterprise Java Bean via an EJB container, giving details of at least three such services.

10 marks

Entity manager, Timer service, JNDI, Dependency injection, security

Question 2

```
@Stateless
public class MyEntityFacade {
    @PersistenceContext(unitName = "MyApp-ejbPU")
    private EntityManager em;

    public void create(MyEntity e) {
        em.persist(e); }

    public void edit(MyEntity e) {
        em.merge(e); }
```

a) Read the extract of code above, and answer the following questions:

i) Is this code extract from an Entity Bean, a Session Bean or a Message Bean? In one sentence, state what is the role of this type of bean as part of a JEE application.

2 marks

i) Explain the annotation **@Stateless**, and also explain two alternatives that could have been considered for this type of bean.

7 marks

ii) Explain what a Persistence Context is. **2 marks**

iii) What is the role of the Entity Manager in the context of the code given above?

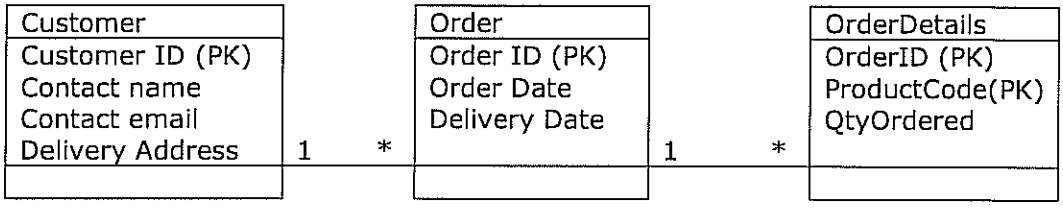
2 marks

b) Explain the role of **Instance Pooling** and **Activation** in EJB resource management.

12 marks

Question 3

a) Define Entity Beans to cater for the data requirements of the class diagram given below. You do not need to include set and get methods, or static queries.



Note:
All relationships are one to many and bidirectional.
OrderID should be automatically generated in the Order table.
Order Details has a compound primary key made up of orderID and ProductCode.

19 marks

b) Write JPQL queries for each of the following. Base your answers on the class diagram from part a) above.

i) A list of all customers. **1 mark**

ii) A list of orders for customers with 'Dublin' in their address. **2 marks**

iii) A list of product codes ordered since January 1st 2012. **3 marks**

Question 4.

a) Having reviewed the code for an existing web based application, you have identified that the application is open to a SQL Injection attack. Report on your findings as follows:

i) Explain, with the aid of an example, how the website's simple login form could be susceptible to a SQL injection attack.

9 marks

ii) Detail some simple measures that could be implemented on the server side to help prevent such an attack.

4 marks

b) Many applications use a simple login form for authentication, which is not the most secure option.
Identify two weaknesses of this method of authentication, and give details of a more secure alternative, supported by JEE security, which addresses both weaknesses. Illustrate your answer with a diagram.

12 marks

Question 5.

a) For a service to be considered a cloud based service, it must satisfy a number of characteristics. Explain five such characteristics.

10 marks

b) As a member of a development team starting a new project, you have been asked to research the potential of using services offered in the Platform as a Service (PaaS) layer of the cloud-computing stack for this project. The project is to develop a web based application implementing a new service for a company. The development work will include integration with some existing legacy systems and data sources. There will be a number of developers on the team.

Report on your findings, including an explanation of PaaS, when it is, and is not, an appropriate choice, and your recommendation for this project.

12 marks

c) Would you agree that large data centres supporting cloud computing are energy efficient solutions for the worlds computing needs? List three points in support of your answer.

3 marks