INSTITUTE OF TECHNOLOGY

BLANCHARDSTOWN

Year	Year 3
Semester	Semester 1
Date of Examination	**Wednesday 14th January 2009**
Time of Examination	**3.30pm – 5.30pm**

Prog Code	BN013	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3012
Prog Code	BN104	**Prog Title**	Bachelor of Science (Honours) in Computing	**Module Code**	COMP H3012
Prog Code	BN302	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3012

Module Title	Object Orientation with Design Patterns

Internal Examiner(s): *Mr. Luke Raeside*
External Examiner(s): *Mr. John Dunnion, 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) **This paper consists of 5 questions.**
3) **Candidates should attempt any 4 questions.**
4) **All questions carry equal marks.**

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

Question 1

a) Describe the role of **Design Patterns** within software development.

[5 marks]

b) List **TWO** consequences of declaring a Java class as **abstract.**

[4 marks]

c) Describe briefly the fundamental characteristics of:

i. Creational Patterns
ii. Behavioural Patterns
iii. Structural Patterns

[12 marks]

d) Define the role of **EACH** of the participants of the **MVC** design pattern.

[4 Marks]

[Total 25 marks]

Question 2

a) The Gang of Four defined the following principle of reusable object-oriented design: "Programme to an interface, not an implementation". Briefly describe **TWO** advantages of applying this principle.

[5 Marks]

b) Define the intent of the **Builder** pattern. List **ONE** consequence of applying this pattern.

[5 Marks]

c) Draw a UML class diagram of the **Builder** pattern. Clearly label each of the participants in the pattern.

[10 Marks]

d) Define the role of each of the following participants of the **Abstract Factory** pattern:

i. Abstract Factory
ii. Concrete Factory
iii. Abstract Product
iv. Concrete Product

[5 Marks]

[Total 25 marks]

Question 3

a) Define the intent of the **Singleton** pattern.

[3 Marks]

b) Create a Java class called *SingleConnection* so that only one instance of this class can be created, i.e., apply the **Singleton** pattern. Provide a method within the class called *getSingleConnection()* that returns the only possible instance of the class.

[15 Marks]

c) Use intuitive examples to describe the difference between the **Adapter** pattern and the **Façade** pattern.

[7 Marks]

[Total 25 marks]

Question 4

a) Describe briefly the intent of **EACH** of the following patterns:

i. **Iterator**
ii. **Observer**

[8 Marks]

b) Draw a UML class diagram for the **Chain Of Responsibility** pattern. Outline the role of EACH of the participants shown in the diagram.

[10 Marks]

c) Discuss briefly the consequences of applying the **Command** pattern.

[7 Marks]

[Total 25 marks]

Question 5

a) List **ONE** difference between the **Abstract Factory** pattern and the **Factory Method** pattern.

[2 Marks]

b) Describe briefly the intent of **EACH** of the following structural design patterns:

i. **Composite**
ii. **Decorator**

[8 Marks]

c) Draw a UML diagram to represent the relationships between the participants of the **Proxy** pattern.

[8 Marks]

d) Briefly describe using an example the consequences of applying the **Flyweight** pattern to a software design problem.

[7 Marks]

[Total 25 marks]