INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Year	**Year 3**
Semester	**Semester 2**
Date of Examination	Tuesday 21st May 2013
Time of Examination	9.30am – 11.30am

Prog Code	BN302	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3032
Prog Code	BN013	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3032
Prog Code	BN104	**Prog Title**	Bachelor of Science (Honours) in Computing	**Module Code**	COMP H3032

Module Title	Object Orientation with Design Patterns

Internal Examiner(s): **Dr. Luke Raeside**

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 tables above
2) Answer ANY FOUR questions
3) 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** categories of design patterns as described by the "Gang of Four". Describe briefly the characteristics of **EACH** of the categories listed.

[10 marks]

c) Describe briefly the **intent** of the **MVC** design pattern.

[3 Marks]

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

[7 Marks]

[Total 25 marks]

Question 2

a) Using an intuitive example explain clearly the **intent** of the **Adaptor** pattern.

[5 marks]

b) Create a Java class called *President* so that only one instance of this class can be created, i.e., apply the **Singleton Pattern** to this class. Provide a method within the class called *createPresident()* that returns a reference to the **only possible instance** of the class.

[12 marks]

c) Describe using an intuitive example the function of the **Façade** design pattern.

[5 marks]

d) Outline **ONE** advantage of implementing the **Façade** pattern.

[3 marks]

[Total 25 marks]

Question 3

a) Draw a **UML** class diagram to represent the relationships between the participants of the **Decorator** pattern.

[8 marks]

b) Draw an outline **UML** class diagram to illustrate the **Composite** pattern. Outline the role of **EACH** of the participants shown in the diagram.

[11 marks]

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

[6 marks]

[Total 25 marks]

Question 4

a) Distinguish clearly between **class inheritance** and **interface inheritance**.

[5 Marks]

b) Describe briefly the **intent** of the **Abstract Factory** pattern.

[3 Marks]

c) Draw a **UML** class diagram of the **Abstract Factory** pattern. Clearly label **EACH** of the participants in the pattern.

[8 Marks]

d) Outline the **role** of **EACH** of the following participants of the **Builder** pattern:

i. **Director**
ii. **Builder**
iii. **Concrete Builder**

[9 Marks]

[Total 25 marks]

Question 5

a) Describe the differences between the following design patterns in terms of the **role of the participants** and the **intent** of the pattern. Include an outline **UML** diagram for **BOTH** of the patterns described in your answer.

i. **Factory Method**
ii. **Builder** **[16 marks]**

b) Describe briefly **ONE positive** and **ONE potentially negative** consequence of the **Flyweight** pattern.

[6 marks]

c) Outline the **intent** of the **Proxy Pattern.**

[3 marks]

[Total 25 marks]