# INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

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| **Year** | **Year 3** |
| **Semester** | **Semester 2** |
| **Date of Examination** | Monday 12th May 2014 |
| **Time of Examination** | 12.30pm – 2.30pm |

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|---|---|---|---|---|---|
| **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 |

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| **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 in detail the term **Design Pattern** under the following headings:

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

**[12 marks]**

b) Outline the role of an **abstract class** within the context of **object oriented** design patterns.

**[4 marks]**

c) Describe the function of **EACH** of the participants of the **MVC** design pattern.

**[9 marks]**

**[Total 25 marks]**

## Question 2

a) Describe briefly the **Intent** of the **Decorator** design pattern.

**[3 marks]**

b) Describe the role of **EACH** of the participants of the **Decorator** design pattern.

**[12 marks]**

c) Draw a **UML** class diagram to represent the **Proxy** design pattern. Outline the function of **ONE** of the participants shown in the **UML** diagram.

**[10 marks]**

**[Total 25 marks]**

## Question 3

a) Explain briefly the **Intent** of the **Adapter** pattern.

**[3 marks]**

b) Differentiate clearly between the intent of the **Adapter** design pattern and the **Intent** of the **Façade** design pattern.

**[6 marks]**

c) Draw a detailed **UML diagram** for the **Adapter** design pattern. Explain briefly the role of **ONE** of the participants shown in the UML diagram.

**[10 marks]**

d) Describe briefly **TWO** consequences of implementing the **Singleton** design pattern.

**[6 marks]**

**[Total 25 marks]**

## Question 4

a) Draw a sample **UML class diagram** to illustrate **polymorphism**. Include at least **ONE** polymorphic method in your diagram.

**[6 marks]**

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

**[4 marks]**

c) Define the role of the **Director** participant of the **Builder** pattern.

**[3 marks]**

d) Draw a detailed **UML** class diagram of the **Abstract Factory** design pattern. Outline the function of **ANY TWO** of the participants shown in the UML diagram.

**[12 marks]**

**[Total 25 marks]**

## Question 5

a) Outline the **intent** of **EACH** of the following patterns:

i. **Proxy**
ii. **Composite**
iii. **Flyweight**

**[9 marks]**

b) Differentiate clearly between the **intent** of the **Abstract Factory** design pattern and the **Intent** of the **Factory Method** design pattern.

**[6 marks]**

c) Describe the use of **polymorphism** in the design of the **Command** design pattern. Use an intuitive example and a UML diagram to enhance your description.

**[10 marks]**

**[Total 25 marks]**