

**UNIVERSITY OF BOLTON**

**BUSINESS & CREATIVE TECHNOLOGIES**

**MSC INFORMATION TECHNOLOGY**  
**MSC IT SYSTEMS DEVELOPMENT**

**SEMESTER ONE EXAMINATION 2010/2011**

**ENTERPRISE INFRASTRUCTURES**

**MODULE NO: MIT4104**

Date: 19<sup>th</sup> January 2011

Time: 10:00 – 12:00

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**INSTRUCTIONS TO CANDIDATES:**

There are SIX questions.

Answer ANY FOUR questions.

All questions carry equal marks.

Marks for parts of questions are shown in brackets.

Unless otherwise stated all symbols take their usual meaning.

Electronic calculators may be used provided that data and program storage memory is cleared prior to the examination.

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Games Computing and Creative Technologies  
MSc Information Technology / MSc IT Systems Development  
Semester 1 Examination 2010/2011  
Enterprise Infrastructures  
Module No. MIT4104

**Question 1**

Q1 Logically partitioned systems and/or parallel clusters are rapidly becoming the default architectures for large enterprise level computing environments. Critically assess these two approaches with a focus on their operation, architecture and design objectives.

**(25 marks)**

**Question 2**

Q2 a) Legislation on occasion dictates that a service must be fault tolerant and disaster tolerant. What is meant by these terms and how do they differ from their close relative High Availability. In what other circumstances would a fault tolerant service be justified?

**(5 marks)**

b) It is claimed that HP NonStop systems can achieve fault tolerance, analyse the architecture of such systems in a manner that critiques their ability to achieve fault tolerance and justifies their expense.

**(20 marks)**

**Question 3**

Q3 a) High Availability (HA) clusters are a common choice for organisations that offer important services over the internet, such as airline booking systems or internet banking. Provide a detailed description of an HA cluster, justify the proposition that such clusters do achieve HA, and annotate the sequence of events that would occur during and after a failover. Why is HA a popular choice for internet based services?

**(25 marks)**

**Question 4**

Q4 a) Provide a comprehensive analysis of enterprise level storage arrays. Ensure that you explain their functionality, assess the relative merits of using such arrays and critique the various ways in which raw storage is commonly configured.

**(25 marks)**

**Please turn the page**

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**Question 5**

Q5 a) Fundamentally what is a storage area network (SAN), what is FCP and why is it advantageous. When discussing SANs, what do the terms hub, router, bridge refer to?

**(8 marks)**

b) Compare and contrast Fabric, FC-AL, FC/IP, iSCSI and iFCP explaining how these concepts can compliment each other as part of a single storage solution?

**(17 marks)**

**Question 6**

Q6 a) With respect to contingency planning, compare the terms gradual and immediate recovery (sometimes referred to as cold and hot standby respectively). In what way are these approaches more advanced than simply ensuring that data is backed up?

**(5 marks)**

b) In a consolidated backup environment, analyse the relative merits of using an IP network to transfer the data. What are the dangers and how can these be avoided?

**(5 marks)**

c) Design a simple network backup environment that uses multiple storage pools. Use a diagram to illustrate your design and provide a commentary on the events that will occur during a backup.

**(15 marks)**

**END OF QUESTIONS**