**GRIFFITH COLLEGE DUBLIN**

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**QUALITY AND QUALIFICATIONS IRELAND**

**EXAMINATION**

**HIGHER CERTIFICATE IN COMPUTING**

**STAGE II**

**OPERATING SYSTEMS DESIGN**

**Module code: HCC-OSD**

**BACHELOR OF SCIENCE IN COMPUTING**

**STAGE II**

**OPERATING SYSTEMS DESIGN**

**Module code: BSCO-OSD**

**BACHELOR OF SCIENCE (HONS) IN COMPUTING SCIENCE**

**STAGE II**

**OPERATING SYSTEMS DESIGN**

**Module code: BSCH-OSD**

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**Date: 18th May 2015 Time: 9.45-11.45**

**THIS PAPER CONSISTS OF FOUR QUESTIONS**

**THREE QUESTIONS TO BE ATTEMPTED**

**SECTION A - COMPULSORY**

**SECTION B - TWO QUESTIONS TO BE ATTEMPTED**

**THE USE OF NON PROGRAMMABLE CALCULATORS IS PERMITTED DURING THIS EXAMINATION**

**SECTION A – COMPULSORY**

**QUESTION 1**

1. What is the difference between Turnaround Time, Waiting Time, Response Time and Execution Time?

**(10 marks)**

1. Explain the following:
2. Page thrashing in memory,

**(2 marks)**

1. Memory compaction,

**(2 marks)**

1. Busy wait,

**(2 marks)**

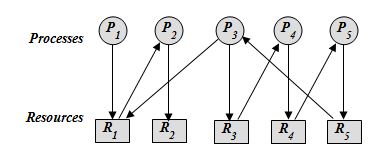
1. Device spooling,

**(2 marks)**

1. Quantum in process management.

**(2 marks)**

1. Apply the Directed Resource Graphs to detect the presence of a deadlock in the system of processes and resources outlined in the figure below:

**(10 marks)**

1. A program requests pages in the following order:

**a b c a c d a c b e c b d**

Construct a **page trace analysis** indicating page faults with an asterisk (**\***) using the **Least Recently used** policywhere 3 page frames were allocated to the program in main memory.

**(10 marks)**

1. Explain Segmented Demand Paging? Outline the advantages and disadvantages.

**(10 marks)**

**Total (50 marks)**

**SECTION B - TWO QUESTIONS TO BE ATTEMPTED**

**QUESTION 2**

* + 1. Define I/O-bound and CPU-bound jobs.

**(4 marks)**

* + 1. Is it better to have more I/O-bound jobs or CPU-bound jobs scheduled for the CPU? Explain your answer.

**(6 marks)**

1. Write at least five correct statements about threads.

**(5 marks)**

1. Explain each of the two problems the test-and-set mechanism has, and then explain how a semaphore had overcome those two problems.

**(10 marks)**

**Total (25 marks)**

**QUESTION 3**

1. For both sequential access contiguous and direct access contiguous file organisations, describe how records are accessed from files in both fixed and variable size records?

**(10 marks)**

(b) With reference to process scheduling, explain the following:

1. Context Switching.

**(3 marks)**

1. Aging.

**(3 marks)**

1. With reference to the Dining Philosopher problem:
   1. Describe, with the use of a diagram, the Dining Philosopher problem and outline the problems it demonstrates.

**(6 marks)**

* 1. Explain three possible solutions to the problem.

**(3 marks)**

**Total (25 marks)**

**QUESTION 4**

1. What are the four responsibilities of Device Managers?

**(8 marks)**

1. Differentiate between Interactive and Real time processing systems.

**(7 marks)**

1. While retrieving data from Track 45, the following list of requests has arrived: Track 48, 60, 50, 20, 30, 10 and 5. The directional bit was indicating that the head was moving from track 0 towards the maximum track of 90. It takes 1ms to travel from one track to next.
2. Draw a diagram to illustrate the FIFO Strategy.

**(5 marks)**

1. What is the difference between a LOOK and a SCAN strategy?

**(5 marks)**

**Total (25 marks)**